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Diversifying sovereign risk in the euro-area: Empirical analysis of different policy proposals



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Abstract

The 2010 sovereign crisis in the euro area highlighted the dangers of the sovereign-bank nexus –the risk amplification effect of sovereign debt being held primarily by domestic banks. In response, important regulatory and institutional changes at the European level were put in place. Despite this, the debate on how banking regulation should account for this sovereign-bank interdependence continues today. We review the main regulatory proposals in this area and assess their impact on banks and sovereign bond markets. We conclude that these solutions could have relevant side effects for both, thus implying that non-regulatory options to complete the Monetary Union and, in particular, to issue a European safe asset, are the first order mitigating solution for this vulnerability.

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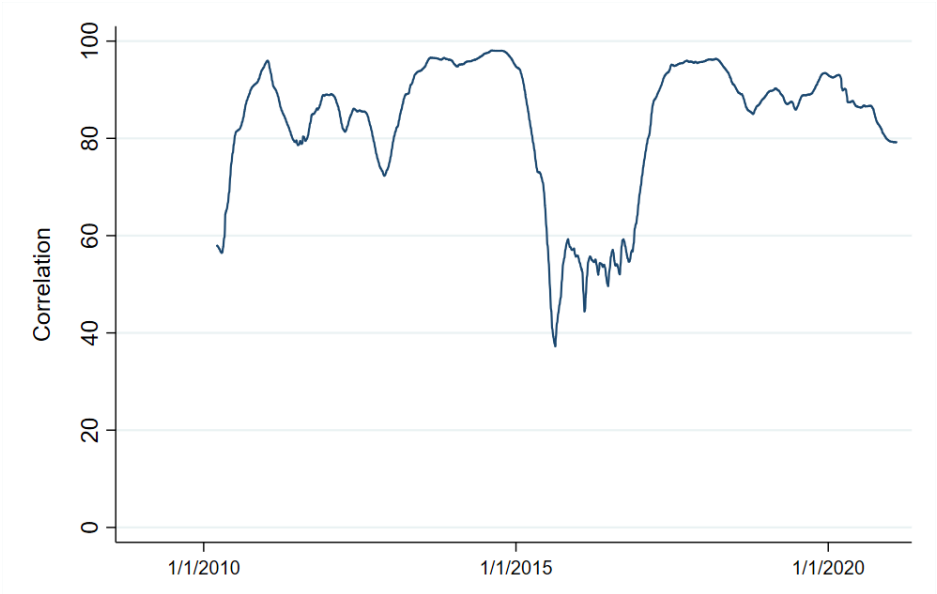
Context

There is broad consensus that excess concentration of sovereign debt in domestic banks can be a source of vulnerabilities. In particular, in the event of a crises, it may create a feedback loop between sovereign debt and the banking sector. This amplifies overall risk through two channels. On the one hand, an expansion in bank leverage can increase the probability of bank default and subsequent bail-out, heightening sovereign risk. On the other hand, an increase in sovereign risk can reduce bank asset quality and boost bank leverage and default (Brunnermeier et al., 2016). This could be especially the case in the Eurozone Area (EA), where individual countries issue sovereign debt in an incomplete currency union where the common currency is managed by a supranational institution, the European Central Bank (ECB). In fact, as can be observed in Figure 1, the correlation between sovereign and bank CDS was close to one for Spain during the 2010-12 EA sovereign debt crisis.

Figure 1. Correlation between sovereign and bank CDS
Percentage, %



Note: Correlation represents correlation between 5-year Spanish sovereign and the average 5-year CDS for the banking sector over a 360-day period. Banking sector includes CDS for Santander, BBVA, Bankinter, and Sabadell.
Source: Refinitiv

However, sovereign debt, and safe assets in particular, are vital to the well-functioning of credit intermediation. As highly liquid assets, they are the basic collateral and are also used to cover the liquidity regulatory requirements (see, for example, Basel Committee on Banking Supervision, 2013).

Therefore, although banking regulation could help to mitigate risks and vulnerabilities, implications for other areas should be analysed and alternative solutions considered. Specifically in the EA, where a well-publicized particularity is the relative scarcity of safe assets when compared to other developed economies due to the lack of a common public asset.

Current regulatory framework

The current approach to the capital treatment of sovereign exposures in the EA in part responds to Pillar 1 requirements from Basel regulation. A special carve-out clause referenced in both Basel regulation and European Capital Requirements Regulation (CRR) leads to a 0% risk-weight being applied to sovereign debt for all exposures to member states. From a market risk perspective, the framework aims to provide coverage from interest rate risk derived from the mark-to-market of sovereign debt held in the trading book. Besides, we should not forget that the leverage ratio provides a non-risk sensitive backstop to sovereign debt holdings. Under this ratio, banks must hold a minimum of eligible capital as a percentage of their total assets, including sovereign bonds.

On the liquidity front, sovereign debt top-rated (AAA-AA) is assigned the highest quality for the liquidity coverage ratio (LCR). A special carve-out exists for domestic sovereigns below AA rating which can also be included in the high-quality bucket. Furthermore, sovereign debt is also treated under the most preferential bucket under legislation that defines the net-stable-funding ratio (NSFR).

Overview of policy proposals

Practitioners, politicians and academics have been discussing this issue for a long time, but the debate came back to the forefront during the Covid-19 pandemic. Policy proposals can be classified into two groups. First, the non-regulatory options that relate to the completion of the currency union in the EA and, in particular, to the creation of a common safe asset. And second, the regulatory options, that aim to curtail the concentration of sovereign risk in the banking system mostly through the application of risk weights (RW) to sovereign exposures. These last proposals would affect not only the EA banking system but also those of other areas.

Non-regulatory options

The non-regulatory options depart from the banking regulation framework, but they are not independent from it, as it would be advisable that these proposals go together with a specific regulatory treatment of the common safe assets proposed.

- **National tranching (Wendorff and Mahle, 2015)**: Sovereigns issue debt under different ranks of seniority called tranches. Payment to the lower tranches would be subordinated to prior payment on higher or "senior" tranches. To further diversify risk, an intermediate agent would buy these senior tranches from a range of countries and issue securities.
- **European Safe Bonds – ESBies (Brunnermeier et al. 2017)**: Under this proposal a financial intermediary would buy a pool of sovereign debt weighted according to a pre-determined ratio (the ECB capital key has been proposed). This pool of assets would be financed by issuing securities under two tiers: European Safe Assets (ESBies) or European Junior Bonds (EJBies).
- **E-bonds (Monti, 2010 and Juncker and Tremonti, 2010):** This approach extends preferred creditor status to a financial intermediary created to buy sovereign bonds financed by the issuance of its own bonds. This intermediary would either buy debt in public markets or issue private loans to countries.
- **European Debt (Alogoskoufis et al., 2020):** Debt issued under an EA budget based on state contributions or backed by an EA wide tax or a direct revenue source. This represents a full risk-sharing option and the creation of a complete European safe asset. It could be said that the financing of the Next Generation EU programme was a first step in this direction.

Regulatory proposals

While it could be argued that the options from the previous section go more directly into the core of the problem, they require significant political agreement at the EA level. On its side, the regulatory options have been proposed at different international fora. For example, the Basel Committee on Banking Supervision (BCBS) voiced their commitment to revisiting sovereign capital regulation; in particular, they commented on the possibility of applying concentration charges to the risk-weight treatment of sovereign debt (BCBS, 2017). However, it has been in Europe where the proposals have reached a certain level of detail.

- **Non-zero sovereign risk floor (ESRB, 2015):** Under this proposal, all sovereign exposures would receive a fixed risk-weight penalization. Capital requirements could be independent to portfolio composition, or, on the other hand, they could be focused solely on national exposures and, therefore, include benefits from diversification. In this last case, increases in overall sovereign debt would only result in a capital charge if they were related to a bank's own country sovereign.
- **Removing the domestic carve-out (ESRB, 2015)**: This measure would lead to the application of standard risk ratings on sovereign exposures.
- **Sovereign concentration charges (Veron, 2017; BCBS, 2017**): Capital charges on sovereign debt would be a function of marginal risk weights. Notably, important differences regarding proposed calibration have been seen in the literature.
- **The Eurozone Basket (Matthes and Rocholl, 2017) and European Safe Portfolio (Garicano, 2019).** In the first case, holdings in proportion to the ECB capital key would be considered part of the regular functions of the banking system. Consequently, they would be exempt from any capital provisions. Sovereign debt more than the proportional part of the respective country key would be capitalized under standard regulatory capital methods.

In the second case, banks would face capital charges (or "concentration" charges), in proportion to the distance between their own sovereign debt portfolio and the "safe portfolio" which is the ECB capital key. Therefore, excess exposure and lack of exposure penalize equally. This would provide a strong incentive for banks to migrate their exposures to the ECB capital key in what is considered by the author to be the basis of market-provided European Safe Assets without joint liability.

A combination of both capital requirements as concentration charges and credit risk has also been put forward, most notably by German Finance minister Scholz in his "Position paper on the goals of the banking union".

Empirical analysis of the regulatory proposals and bank simulation

In this section, we have conducted an empirical analysis of the impact of the different regulatory proposals described above would have on banks' CET1 capital ratios. We use balance sheet data from the 2023 EBA Transparency exercise disclosures on sovereign exposures and other assets.

Initial evaluation

In Table 1 below we show sovereign exposure by country where the bank is domiciled (Y-axis) and the nation of exposure (X -axis). As can be seen, the diagonal, which represents the same country of origin and exposure, shows the highest level of concentration clearly highlighting home-bias among EA members.

Interestingly, the table also reveals insights into banks capital allocation decisions and subsidiary exposures. For example, Belgian and Portuguese banks have over 10 percent of their Tier 1 capital invested in French sovereign debt. Dutch, and Italian banks have over 10 percent of Tier 1 capital invested in German sovereign debt. In this sense, banks, considering cross-country ownership, seem to be both arbitraging in search for yield between sovereign debt exposures given the common zero risk-weights as well as implicitly choosing their de-facto safe asset.

Table 1. Heatmap of Sovereign Exposures as a Percentage of Tier 1 Capital
Percent, %

Country of Bank	Country of Exposure																
	AT	BE	CY	DE	EE	ES	FI	FR	GR	IE	IT	LI	LU	MT	NL	PT	SI
AT	33.4	2.2	0.0	5.2	0.1	0.8	0.1	2.9	0.0	0.5	1.7	0.3	0.5	0.1	0.5	0.2	2.1
BE	2.2	94.6	0.0	3.0	0.3	7.5	0.2	12.2	0.0	3.4	4.2	1.5	1.4	0.1	0.7	0.7	2.3
CY	1.2	2.0	62.6	0.5	0.0	2.4	0.0	2.2	0.0	0.0	1.2	0.0	4.0	0.0	0.0	0.0	0.0
DE	4.5	3.8	0.1	66.6	0.0	6.2	2.5	8.3	0.8	0.8	16.0	0.0	0.4	0.0	1.5	0.6	0.2
EE	3.0	5.4	0.0	0.0	20.7	0.0	0.1	1.8	0.0	0.0	0.0	31.0	0.0	0.0	0.0	0.0	0.0
ES	0.1	3.8	0.0	0.5	0.0	127.1	0.2	2.8	0.0	0.1	27.4	0.0	0.7	0.0	0.0	6.0	0.0
FI	0.3	1.2	0.0	4.0	0.2	0.0	2.5	0.2	0.0	0.0	0.0	0.1	0.0	0.0	1.1	0.0	0.0
FR	0.8	7.0	0.0	7.3	0.0	5.0	3.5	101.4	0.3	0.8	10.2	0.0	2.0	0.2	1.4	1.4	0.2
GR	0.2	6.6	5.4	3.3	0.0	14.3	0.0	1.7	152.1	0.0	32.2	0.1	3.3	0.0	0.0	2.2	0.0
IE	0.2	2.3	0.1	5.3	0.0	15.0	0.0	6.1	0.1	16.2	26.1	0.0	1.3	0.0	0.3	0.9	0.0
IT	6.0	2.8	0.0	13.4	0.0	23.6	0.5	13.3	0.0	1.0	162.0	0.0	0.3	0.0	0.7	2.4	0.6
LI	0.2	0.9	0.0	2.8	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.0
LU	0.7	23.4	0.0	5.8	0.0	17.4	0.0	26.6	0.0	1.3	1.0	0.5	32.8	0.0	0.8	1.0	0.3
MT	12.8	13.5	1.4	40.7	0.3	10.7	0.0	13.6	0.0	3.4	16.3	1.6	7.6	108.8	5.0	1.1	2.6
NL	3.8	19.0	0.0	12.0	0.0	4.3	3.3	6.2	0.0	0.2	1.6	0.0	3.4	0.0	33.8	0.0	0.0
PT	4.6	16.4	0.1	10.9	0.0	50.0	0.0	30.9	0.0	10.2	5.7	0.1	1.3	0.0	2.4	114.1	0.6
SI	5.0	7.2	0.5	2.7	0.3	2.6	0.1	5.4	0.0	2.9	1.4	0.8	0.4	0.3	2.7	2.3	30.0

Source: EBA 2023 Transparency Exercise. Data as of June 2023

Static impact on banks portfolios

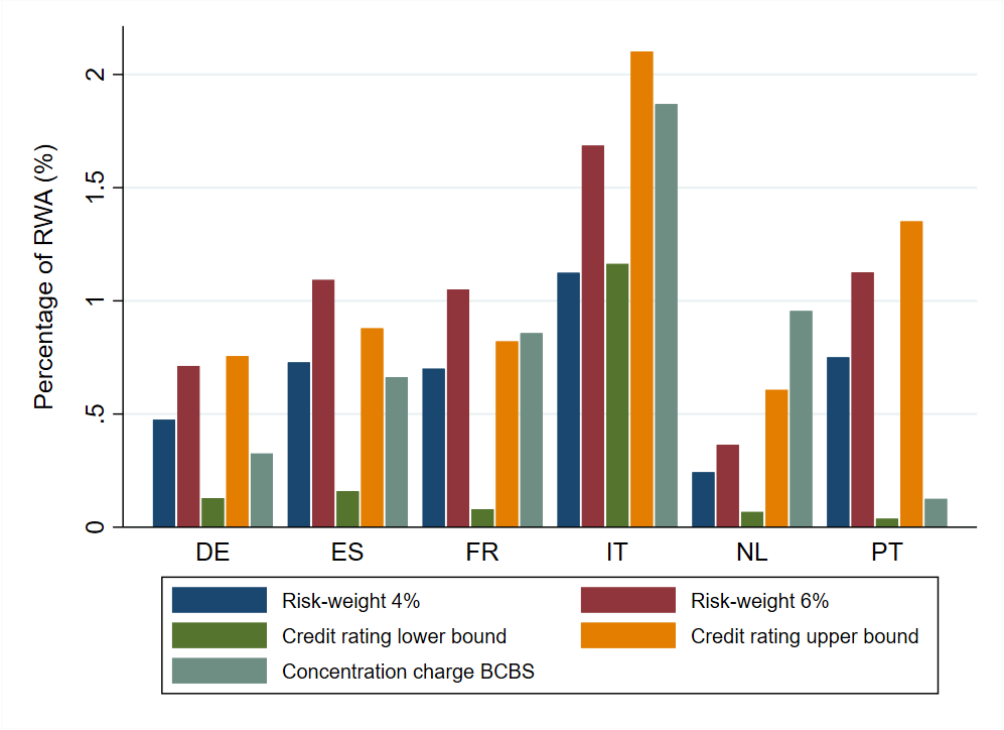
To assess the potential impact of the different regulatory proposals we run a static balance sheet analysis based on the different set of scenarios:

- Fixed risk weights: Applying a 4 percent or 6 percent risk weight to national sovereign exposures.
- Risk-based weights: Applying risk-weights based on Fitch credit rating. We use the low and the high end of BCBS illustrative example (BCBS, 2017).
- Concentration charges: We use marginal risk weights following Veron (2017) and the BCBS (2017).

Importantly, our analysis in this section is based on static-balance sheets and does not consider potential shifts in asset allocation from banks to respond to portfolio rebalancing. In that sense, this can be seen as a picture of how the banking system would look today before any reaction to the proposals implemented.

We calculate the percentage change in RW assets by type of regulatory treatment in Figure 2 below. Some general trends stand out among the 6 largest EA countries from an aggregate perspective. For countries with investment grade national debt, the lower marginal risk weight of credit rating proposal has the lowest impact. This excludes Italy, which is significantly impacted by this measure by around 1 percent of RWA, as BBB debt would have a 4 percent risk-weight. Concentration charges following the BCBS illustrative example seems to be the most punitive for the Netherlands. A flat 6 percent risk weight on national sovereign holdings has the highest impact for Spain and France while the upper bound proposal based on credit rating risk-weights has the strongest impact for Germany, Italy, and Portugal. We exclude from the chart the impact of concentration charges following Veron given its disproportionate impact compared to the rest of the measures.

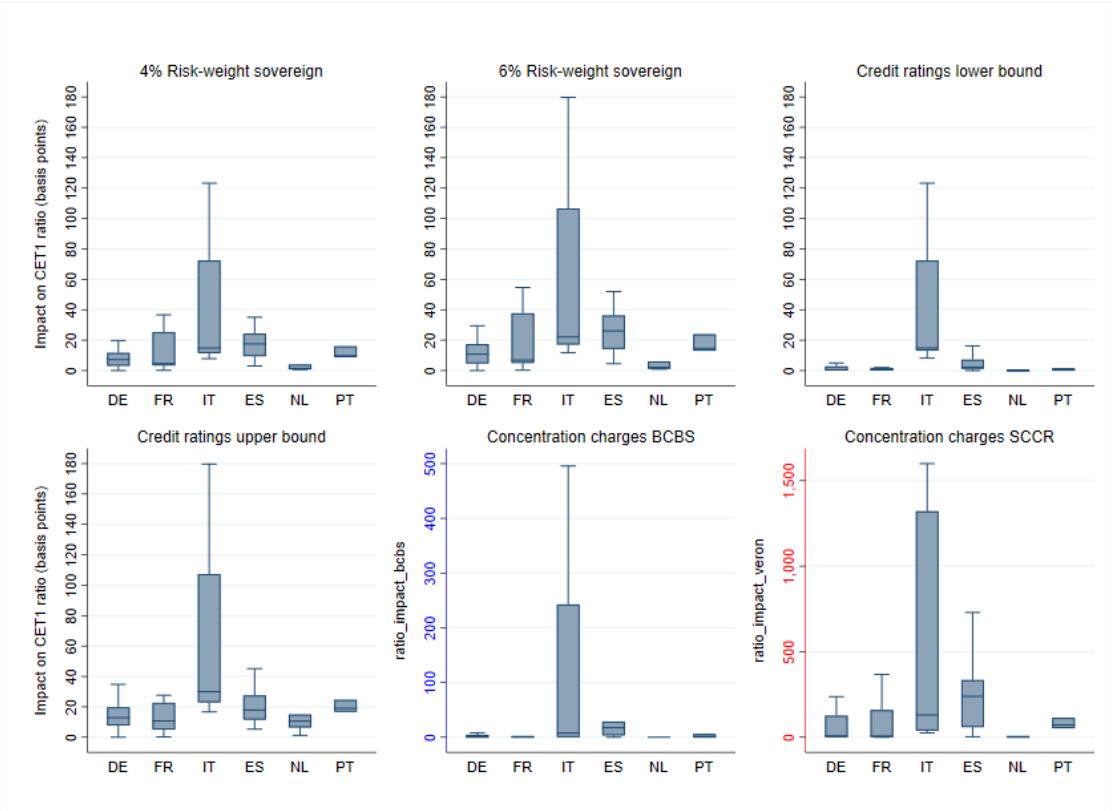
Figure 2. Aggregate Impact on RWA by type of regulatory treatment of sovereign debt holdings
As a percentage of total RWA



Source: EBA Transparency Exercise, Authors Calculations. Data as of June 2023.

We then translate RWA impacts into CET 1 ratio in Figure 3. From a bank-level perspective, we include the main descriptive statistics (min, max, mean, 25th and 75th percentile) in the box and whiskers plot below. We see how most proposals have an individual impact between 10 to 60 basis points of CET1 with a very high dispersion between and within countries. Notably, concentration charges following BCBS has roughly 1.5 times the range of other proposals, mostly attributable to relatively stronger impact on Italian banks. Finally, adding calibrations based on Veron (2017) could lead to triple or quadruple digit impacts for many banks.

Figure 3. Bank-level Impact on CET1 by type of regulatory treatment of sovereign debt holdings
Impact on CET1 ratio (basis points)



Source: EBA Transparency Exercise, Authors Calculations. Data as of June 2023.
Note: Excludes outliers defined as values outside 1.5 times the interquartile range (25th to 75th percentile).

Dynamic effects on sovereign markets

Capital concentration charges could pose a strong catalyst for banks to rebalance their sovereign debt portfolio, affecting, consequently, the sovereign debt markets.

In this section we present a simulation exercise to illustrate these potential effects. We caveat that the results are highly dependent on initial assumptions for buying-selling conditions, but the aim is to establish empirically based ranges for the impact of the regulatory proposals in a more realistic framework where banks' balance sheets respond to minimize the impact from regulation.

We use bond prices across 6 different maturities for European bonds to match EBA Transparency Exercise disclosure where longer-term maturities are proxied with a 10-year bond for simplicity.[1] We take average bond yields across 2023 as our baseline for returns. Volatility is defined as the standard deviation of the yield during the same timeframe. We use BCBS marginal risk weights as our starting point and focus the simulation results on the top 6 EA countries. We also expand our analysis to try and simulate bank behaviour in times of stress. We do so by including a separate time series to represent periods of heightened uncertainty. Returns are proxied as the average yield in 2012, while volatility is the standard deviation of such yield during the same year.

[1] Maturities are 3m, 1y, 2y, 3y, 5y, and 10y.

- **Selling rule:** We assume banks sell all bonds that would generate a capital concentration charge. Bank's goal is to minimize RW assets for every given level of returns, so the optimal decision would be to sell bonds for a given country above 100 percent of Tier 1 Capital.
- **Buying rule: Option 1.** We assume banks aim to maximize returns on their sovereign portfolio and will therefore buy bonds with the highest yields until they will incur a capital concentration charge.
- **Buying rule: Option 2.** Banks buy the bonds with the highest risk-adjusted returns within the same maturity bucket. We proxy risk adjusted returns by using the Sharpe ratio.[2]
- **Buying rule: Option 3.** Banks' goal is to reduce risk and avoid volatility. Banks will buy bonds with the lowest level of volatility during the stress period defined above.
- **ECB capital key:** Banks buy and sell sovereign bonds to replicate the ECB capital key**.**

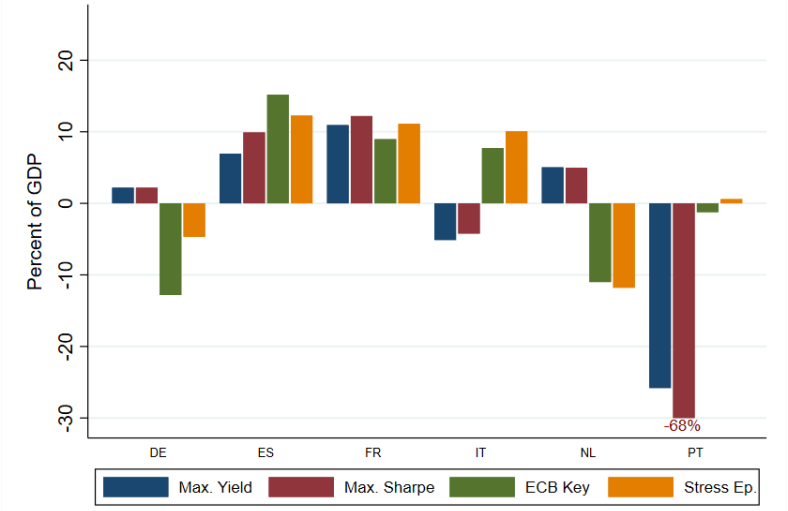
Figure 4 takes the banking system's aggregate exposure by country as of June 2023 and subtracts the final number of holdings after the simulation. The result is scaled by each country's GDP. A positive number represents that current holdings are above the simulated ones while a negative number indicates that current exposure is below simulated values post regulation.

By construction, bank balance sheets remain flat, so total sovereign exposure is constant before and after the simulation both at an individual level and in aggregate. Despite this, the relative and absolute country exposure changes pre- and post-regulation. In practice, this means that overall exposure from the EU banking system to Country A can change, ultimately leading to increased or decreased demand for the respective sovereign bond. From this dynamic perspective and even considering very simple reactions rules (the selling and buying algorithms explained before), impacts are considerable. From an aggregated country perspective results show:

- Current holdings of Franch and Spanish debt are larger than those that would result in all the simulated scenarios.
- Under the scenario where banks aim to maximize yields or buy the bonds with the highest Sharpe ratio, banks would also reduce the holdings of German, and Dutch bonds and they would increase those of Italy and Portugal
- On the contrary, bonds holdings of German and Netherlands bonds would increase if the optimal portfolio were the ECB capital key and those of Italy would diminish.

Figure 4. Sovereign debt post simulation

Percent of country GDP



Source: EBA Transparency Exercise, Bloomberg L.P., Authors Calculations.
Note: A positive number represents that current holdings are above the simulated ones while a negative number indicates that current exposure is below simulated values post regulation.

[2] Defined as the ratio of the current yield over its standard deviation over the past 4 quarters.

Conclusions

Credit institutions invest in domestic sovereign debt for well-founded economic reasons. Specifically, these markets tend to be the deepest and broadest in each jurisdiction, making public debt an ideal instrument to maintain the liquidity reserves necessary to operate safely. Furthermore, sovereign debt default events are extremely rare, especially in the case of developed economies, which is why they tend to constitute the economy's safest asset. This makes public debt a particularly attractive instrument in situations of uncertainty.

However, holdings of public debt on bank balance sheets can also give rise to vulnerabilities, as result of the transmission of risks between the sovereign and banks. For example, such a vulnerability materialized after the global financial crisis in what was called the sovereign debt crisis of the euro area. The interaction of the crisis with the existing institutional deficiencies within the European monetary area, particularly the lack of a common safe asset, made the sovereign-bank link especially dangerous.

The institutional reforms since then and the Basel 3 profound review of banking regulation have prevented a crisis of the same nature from being repeated in recent years despite the multiple disturbances that the financial system has suffered. However, some academics and practitioners at the European level consider that this vulnerability is still present. In this respect, there is consensus in considering that the first order solution to mitigate this vulnerability is to complete the Monetary Union in Europe; in particular, to create a risk-free common European asset that could be the European collateral. This is also a critical element for the success of the Capital Markets Union.

Other solutions, such as the proposals based on reconsidering the risk-weight treatment for sovereign bonds, could be considered second order and they could have relevant side effects both for the bond markets of several countries and the behaviour of the banks.

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